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09/915,235	07/24/2001	Luciano Pasquale Agostino Nocera	EYEM1260-1	5615

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EXAMINER

MCCARTNEY, LINZY T

ART UNIT	PAPER NUMBER
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2671

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DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/915,235

Applicant(s)

AGOSTINO NOCERA ET AL.

Examiner

Linzy McCartney

Art Unit

2671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 5, 9, 13, 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al., "Model Based Face Reconstruction For Animation" in view of Wiskott et al., "Face Recognition by Elastic Bunch Graph Matching".

- a. Referring to claim 1, Lee discloses providing a neutral-face front head image and a side head image for generating an avatar ("...the face is in neutral expression..." – page 5, paragraph 1; Fig 1.); automatically positioning nodes within feature locations on the front head image and the side head image ("...provide automatic feature points extraction method...we consider...points such as eyes, nose, lip eyebrows and ears as feature points..." – page 6, paragraph 1; Fig. 1; Fig. 2); manually reviewing and correcting the node positions to remove artifacts and minimize distorted features in the avatar generated based on the node positions ("...interface for interactive correction if and when needed..." – page 6, paragraph 1; Fig. 1). Lee does not explicitly disclose automatically finding head feature locations on the front head image and the side head image using elastic bunch graph matching. Wiskott discloses automatically finding head feature locations on a front head image and a side head image using elastic bunch graph matching ("graph...representing a face consists of nodes...the nodes are located at facial

landmarks... graphs for new images can be generated automatically by elastic bunch graph matching...” – page 130, column 1, full paragraph 2; page 131, column 1; Fig. 1).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the method of Lee by automatically finding head feature locations using elastic bunch graph matching. The suggestion/motivation for doing so would have been because using elastic bunch graph matching requires a general representation rather than models of individual faces (Wiskott, page 130, column 1, third full paragraph – column 2 first paragraph).

b. Claim 5 is rejected with the rationale of claim 1. Claim 5 is claim 1 recited as a system. The modified method of Lee as applied to claim 1 above discloses a system (“...we have developed a face recognition system...” – Lee, page 8, paragraph 5)

c. Referring to claim 9, Lee discloses providing a neutral-face front head image and a side head image for generating an avatar (“...the face is in neutral expression...” – page 5, paragraph 1; Fig. 1.); automatically positioning nodes at feature locations on the front head image and the side head image (“...provide automatic feature points extraction method...we consider...points such as eyes, nose, lip eyebrows and ears as feature points...” – page 6, paragraph 1; Fig. 1); manually reviewing and correcting the node positions to remove artifacts and minimize distorted features in the avatar generated based on the node positions (“...interface for interactive correction if and when needed...” – page 6, paragraph 1; Fig. 1). Lee does not explicitly disclose automatically finding head feature locations on the front head image and the side head image using image analysis based on wavelet component values generated from wavelet

transformations of the respective neutral-face front head image and the side head image. Wiskott discloses automatically finding head feature locations on the front head image and the side head image using image analysis based on wavelet component values generated from wavelet transformations of the respective neutral-face front head image and the side head image (“...a jet is based on a wavelet transform...a jet is defined as the set...of 40 complex Gabor wavelet coefficients...the...FBG serves as a general representation of faces. Each stack of discs represent a jet....” – page 129, column 2, paragraph 2; Figure 2, caption). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the method of Lee by automatically finding head feature locations using image analysis based on wavelet component values generated from wavelet transformations as taught by Wiskott. The suggestion/motivation for doing so would have been because using elastic bunch graph matching requires a general representation rather than models of individual faces (Wiskott, page 130, column 1, third full paragraph – column 2 first paragraph).

d. Referring to claim 13, Lee does not explicitly disclose the wavelet transformations use Gabor wavelets. Wiskott discloses the wavelet transformations use Gabor wavelets (“...faces are represented...by a Gabor wavelet transform...a jet is defined as the set...of 40 complex Gabor wavelet coefficients...”—Abstract page 129, column 2, paragraph 2). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the method of Lee having the wavelet transformations use Gabor wavelets as taught by Wiskott. The suggestion/motivation for doing so would have been because using elastic bunch graph matching requires a general

Art Unit: 2671

representation rather than models of individual faces (Wiskott, page 130, column 1, third full paragraph – column 2 first paragraph).

e. Referring to claim 17, Lee discloses creating the avatar based on geometric information associated with the automatically found head feature locations (page 7, paragraphs 2 – page 8, paragraph 1; Figs. 1 and 3).

f. Claim 18 is rejected per claim 9 with the rationale of the rejection of claim 17.

d. Claim 19 is rejected per claim 5 with the rationale of the rejection of claim 17.

3. Claims 2-4, 6-8, and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Wiskott as applied to claims 1, 5, and 9 above further in view of Thalmann et al., “Face to Virtual Face”.

a. Referring to claim 2, the modified method of Lee as applied to claim 1 above does not explicitly disclose applying an animation transform based on the corrected node positions for the neutral face. Thalmann discloses applying an animation transform based on the corrected node positions for the neutral face (“...the mask can be interactively adjusted...to reproduce the corresponding movements on the virtual face, a mapping is carried out from the tracked features to the appropriate MPA’s...for facial animation...” -- page 876, column 2, paragraph 1 – page 877, column 1, paragraph; Fig. 5). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to further modify the method of Lee by generating an animation transform based on the corrected node positions for the neutral face as taught by Thalmann. The suggestion/motivation for doing so would have been because it would allow the

mimicking of the facial expression of the real person on his clone (Thalmann, page 877, column 1, paragraph 1 – column 2, paragraph 1).

c. Referring to claim 3, Lee does not explicitly disclose applying the animation transform to expression face avatar meshes for generating the avatar. Thalmann discloses applying the animation transform to expression face avatar meshes for generating the avatar (Figure 7). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to further modify the method of Lee by applying the animation transform to expression face avatar meshes for generating the avatar as taught by Thalmann. The suggestion/motivation for doing so would have been because it would allow the mimicking of the facial expression of the real person on his clone (Thalmann, page 877, column 1, paragraph 1 – column 2, paragraph 1).

d. Referring to claim 4, Lee does not explicitly disclose applying the animation transform to morph targets. Thalmann discloses applying the animation transform to morph targets (“...a mapping carried out from the tracked features to the appropriate MPA’s...the allows us to mimic the facial expression of the real person...” – page 877, column 1, paragraph 1- column 2, paragraph 1; Fig. 7).

e. Claims 6-8 are rejected per claim 5 with the rationale of the rejection of claims 2-4 respectively.

f. Referring to claim 10, the modified method of Lee as applied to claim 9 above does not explicitly disclose applying an animation transform based on the corrected node positions for the neutral face. Thalmann discloses applying an animation transform based on the corrected node positions for the neutral face (“...the mask can be interactively

adjusted...to reproduce the corresponding movements on the virtual face, a mapping is carried out from the tracked features to the appropriate MPA's...for facial animation..." -- page 876, column 2, paragraph 1 – page 877, column 1, paragraph; Fig. 5). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to further modify the method of Lee by generating an animation transform based on the corrected node positions for the neutral face as taught by Thalmann. The suggestion/motivation for doing so would have been because it would allow the mimicking of the facial expression of the real person on his clone (Thalmann, page 877, column 1, paragraph 1 – column 2, paragraph 1).

g. Referring to claim 11, Lee does not explicitly disclose applying the animation transform to expression face avatar meshes for generating the avatar. Thalmann discloses applying the animation transform to expression face avatar meshes for generating the avatar (Figure 7). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to further modify the method of Lee by applying the animation transform to expression face avatar meshes for generating the avatar as taught by Thalmann. The suggestion/motivation for doing so would have been because it would allow the mimicking of the facial expression of the real person on his clone (Thalmann, page 877, column 1, paragraph 1 – column 2, paragraph 1).

h. Referring to claim 12, Lee does not explicitly disclose applying the animation transform to morph targets. Thalmann discloses applying the animation transform to morph targets ("...a mapping carried out from the tracked features to the appropriate



Art Unit: 2671

MPA's...the allows us to mimic the facial expression of the real person..." – page 877, column 1, paragraph 1- column 2, paragraph 1; Fig. 7).

4. Claims 14-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Wiskott as applied to claims 1, 5, and 9 above further in view of Cootes et al., "View-Based Active Appearance Models" (Cootes).

a. Referring to claim 14, Lee does not explicitly disclose mapping sensed facial features to corresponding avatar meshes using linear regression. Cootes suggests mapping sensed facial features to corresponding avatar meshes using linear regression (page 5, column 1, full paragraph 1; page 2, column 1, paragraph 7 and column 2, full paragraph 1 - and column 2, full paragraph 1). At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to further modify the method of Lee by mapping sensed facial features to corresponding avatar meshes using linear regression as taught by Cootes. The suggestion/motivation for doing so would have been because it could rapidly match any of the individual models to a new image (page 1, column 2, full paragraph 1) and the approach would be useful for driving animated avatars (page 5, column 2, paragraph 3).

b. Claim 15 is rejected per claim 9 with the rationale of the rejection of claim 14.

c. Claim 16 is rejected per claim 5 with the rationale of the rejection of claim 14.

#### ***Response to Arguments***

5. Applicant's arguments filed 12/31/03 have been fully considered but they are not persuasive. Applicant contends that the combination of Lee and Wiskott fail to teach "...positioning nodes within feature locations..." The Examiner notes that Lee teaches the

Art Unit: 2671

“snakes” consist of nodes (Lee, Fig. 2 and page 6, paragraph 3). The Applicant argues that Lee teaches placing contours along the edges of feature locations, not within the said feature locations. However, while not conceding the Applicant’s argument, the Examiner would like to point out that a contour along the edge of a feature location **is still within the feature location**.

In addition, the nodes used to outline the hair feature are located within the hair (Fig. 2).

Applicant also argues there is no motivation to combine Lee and Wiskott. However, has noted in the previous Office Action elastic bunch graph matching requires a general representation rather than models of individual faces, which would avoid the expense of constructing a graph for each feature combination (Lee, page 130, column 1, third full paragraph – column 2, paragraph 1) and note that Lee suggests integrating facial recognition methods (page 10, paragraph 6). Regarding the Applicant’s contention that the methods of Wiskott may not be accurate enough for the purpose of creating an avatar, the Examiner notes that Lee discloses reconstruction of shape may not require high accuracy (page 4, full paragraph 3). Regarding the Applicant’s argument that Thalmann uses MPAs, not keyframes the Examiner again reminds the Applicant that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Regarding the Applicant’s contention that Thalmann discloses animation of the model, not creation of the animation data the Applicant is again reminds the Applicant that although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Note that the claim explicitly discloses “...applying the animation transform to expression face avatar meshes for generating the avatar.” A close reading of the Thalmann reference would have

Art Unit: 2671

revealed that the animation transform is applied to expression face avatar meshes (Fig. 5, note the step in which the generic model is deformed and the subsequent generation of avatar).

Regarding the change in Power of Attorney, the Examiner has checked the case file as requested and notes that the correct address is on file. Regarding the correction to title as printed on the file wrapper and official filing receipt, the appropriate changes have been made per MPEP 719.02.

### *Conclusion*

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Linzy McCartney** whose telephone number is **(703) 605-0745**. The examiner can normally be reached on Mon-Friday (8:00AM-5:30PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Mark Zimmerman**, can be reached at **(703) 305-9798**.

Art Unit: 2671

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231


**or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,  
Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding  
should be directed to the Technology Center 2600 Customer Service Office whose  
telephone number is (703) 306-0377.

ltm  
2/2/04

  
MARK ZIMMERMAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600